LINCS-BD2K Perturbation Data Coordination and Integration Center

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For this project we will establish the Data Coordination and Integration Center (DCIC) for the Library of Integrated Network-based Signatures (LINC) program as part of the Big Data to Knowledge (BD2K) initiative. The Center will have four major components: Integrated Knowledge Environment (IKE), Consortium Coordination and Administration (CCA), Data Science Research (DSR) and Community Training and Outreach (CTO). The Center will construct a high-capacity scalable IKE enabling federated access, intuitive querying and integrative analysis and visualization across all LINCS resources and many additional external data types from other relevant resources. The Center will perform, support, and fund several Internal and external DSR projects, addressing various data integration and intracellular molecular regulatory network challenges. The CTO efforts will establish several educational programs including a LINCS MOOC, summer undergraduate research program, initiate and support diverse collaborative projects leveraging LINCS resources, and systematically disseminate LINCS data and tools via a variety of mechanisms. The organizational structure of the Center will include a strong CCA that will support and manage the Center goals and deliverables, and coordinate activities across the LINCS and BD2K programs. The IKE resources will build on the infrastructure, analysis tools and data that we have already established in the LINCS pilot and transition phases, thus minimizing executional risks. The Center brings together a proven team of computational experts with several years of experience with LINCS data and complementary expertise: Drs. Ma'ayan, Schurer, and Medvedovic will develop and deploy a next generation computational infrastructure, develop novel analysis tools and methods enabling researchers to glean new insights from integrative models of biological systems to link complex diseases/phenotypes with drugs and the pathways that those drugs target in different cells and tissues. The project will play a key role to transform and accelerate the discovery of novel therapeutics and improve diagnostics for significantly advancing human health. PUBLIC HEALTH RELEVANCE: The Library of Integrated Network-Based Cellular Signatures (LINCS) project is expected to produce masses of data collected from human cells and tissues perturbed with drugs and other molecules. This data will be integrated in this project to further unravel the molecular networks that control human cell behavior, and this will lead us to improved understanding of how drug action in cells relate to the individual human phenotype.